

ABSTRACT OF THE DISCLOSURE

An olefin polymerization catalyst prepared by a process comprises contacting (A) a transition metal compound in which the number of a transition metal is the same as that of group having a cyclopentadiene type anion skeleton, in its molecule, (C) a modified aluminumoxy compound obtained by reacting an aluminumoxy compound with a boron compound represented by the general formula $BQ^1Q^2Q^3$, wherein Q^1 , Q^2 and Q^3 are respectively a halogen atom, a hydrocarbon group, a halogenated hydrocarbon group, a substituted silyl group, an alkoxy group or a di-substituted amino group and optionally (B) a specified organoaluminum compound, and a process for producing an olefin polymer using the catalyst.